# TCEQ Interoffice Memorandum

**To:** Tony Walker
Director, TCEQ Region 4, Dallas/Fort Worth
Alyssa Taylor
Special Assistant to the Regional Director, TCEQ Region 4, Dallas/Fort Worth

**From:** Allison Jenkins, MPH
Toxicology Division, Office of the Executive Director

**Date:** February 25, 2015

**Subject:** Toxicological Evaluation of Results from an Ambient Air Sample for Volatile Organic Compounds Collected Downwind of the Chesapeake Operating Inc. - Kosel Tar Pad (Latitude 32.736633, Longitude -97.473857) in Fort Worth, Tarrant County, Texas

Sample Collected on January 27, 2015, Request Number 1501024 (Lab Sample 1501024-001)

## Key Points

- Reported concentrations of target volatile organic compounds (VOCs) were either not detected or were detected below levels of short-term health and/or welfare concern.

## Background

On January 27, 2015, a Texas Commission on Environmental Quality (TCEQ) Region 4 air investigator collected a 30-minute canister sample (Lab Sample 1501024-001) downwind of the Chesapeake Operating Inc. - Kosel Tar Pad (Latitude 32.736633, Longitude -97.473857) in Fort Worth, Tarrant County. The sample was collected in response to a hand-held VOC reading. The investigator experienced a very light hydrocarbon odor but no health effects while sampling. Meteorological conditions measured at the site or nearest stationary ambient air monitoring site indicated that the ambient temperature was 62.1°F with a relative humidity of 40.6%, and winds were from the north (358°) at 1.8 to 2.6 miles per hour. The possible emission source (multiple sources) was 0 to 100 feet from the sampling site and 101 to 300 feet from the nearest location where the public could have access. The sample was sent to the TCEQ laboratory in Austin, Texas, and analyzed for a range of VOCs. The list of the target analytes that were evaluated in this review is provided in Attachment A. The VOC concentrations were reported in parts per billion by volume (ppbv) (Attachment B and Table 1). Please note that the available canister technology and analysis method cannot capture and/or analyze for all chemicals.

## Results and Evaluation

Reported VOC concentrations were compared to TCEQ's short-term health- and/or welfare-based air monitoring comparison values (AMCVs) (Table 1). Short-term AMCVs are guidelines used to evaluate ambient concentrations of a chemical in air and to determine its potential to result in adverse health effects, adverse vegetative effects, or odors. Health AMCVs are set to provide a margin of safety and are set well below levels at which adverse health effects are reported in the scientific literature. If a chemical concentration in ambient air is less than its comparison value, no adverse health effects are expected to occur. If a chemical concentration exceeds its comparison value it does not necessarily mean that adverse effects will occur, but rather that further evaluation is warranted.

All of the 84 VOCs were either not detected or were detected below their respective short-term AMCVs. Exposure to levels of VOCs measured in this sample would not be expected to cause short-term adverse health effects, adverse vegetative effects, or odors.

Please call me at (512) 239-0656 if you have any questions regarding this evaluation.

# Attachment A

## List of Target Analytes for Canister Samples

| | | |
|---|---|---|
| ethane | 4-methyl-1-pentene | t-1,3-dichloropropylene |
| ethylene | 1,1-dichloroethane | 1,1,2-trichloroethane |
| acetylene | cyclopentane | 2,3,4-trimethylpentane |
| propane | 2,3-dimethylbutane | toluene |
| propylene | 2-methylpentane | 2-methylheptane |
| dichlorodifluoromethane | 3-methylpentane | 3-methylheptane |
| methyl chloride | 2-methyl-1-pentene + 1-hexene | 1,2-dibromoethane |
| isobutane | n-hexane | n-octane |
| vinyl chloride | chloroform | tetrachloroethylene |
| 1-butene | t-2-hexene | chlorobenzene |
| 1,3-butadiene | c-2-hexene | ethylbenzene |
| n-butane | 1,2-dichloroethane | m & p-xylene |
| t-2-butene | methylcyclopentane | styrene |
| bromomethane | 2,4-dimethylpentane | 1,1,2,2-tetrachloroethane |
| c-2-butene | 1,1,1-trichloroethane | o-xylene |
| 3-methyl-1-butene | benzene | n-nonane |
| isopentane | carbon tetrachloride | isopropylbenzene |
| trichlorofluoromethane | cyclohexane | n-propylbenzene |
| 1-pentene | 2-methylhexane | m-ethyltoluene |
| n-pentane | 2,3-dimethylpentane | p-ethyltoluene |
| isoprene | 3-methylhexane | 1,3,5-trimethylbenzene |
| t-2-pentene | 1,2-dichloropropane | o-ethyltoluene |
| 1,1-dichloroethylene | trichloroethylene | 1,2,4-trimethylbenzene |
| c-2-pentene | 2,2,4-trimethylpentane | n-decane |
| methylene chloride | 2-chloropentane | 1,2,3-trimethylbenzene |
| 2-methyl-2-butene | n-heptane | m-diethylbenzene |
| 2,2-dimethylbutane | c-1,3-dichloropropylene | p-diethylbenzene |
| cyclopentene | methylcyclohexane | n-undecane |

## Attachment B

2/6/2015

**Texas Commission on Environmental Quality**
Laboratory and Quality Assurance Section
P.O. Box 13087, MC-165
Austin, Texas 78711-3087
(512) 239-1716

**Laboratory Analysis Results**
**Request Number: 1501024**

Request Lead:Jaydeep Patel Region:T04 Date Received: 1/30/2015
Project(s): Barnett Shale

| Facility(ies) Sampled | City | County | Facility Type |
|---|---|---|---|
| Chesapeake Operating Inc | Fort Worth | Denton | |

Sample(s) Received

Field ID Number: N0560-012715 Laboratory Sample Number: 1501024-001 Sampled by: Aimi Tanada
Sampling Site: Date & Time Sampled: 01/27/15 10:48:00 Valid Sample: Yes
Comments: Canister N0560 was used to collect a 30-minute downwind sample using OFC-012.
Requested Laboratory Procedure(s):

Analysis: AP001VOC
Determination of VOC Canisters by GC/MS Using Modified Method TO-15

Please note that this analytical technique is not capable of measuring all compounds which might have adverse health effects. For questions on the analytical procedures please contact the laboratory manager at (512) 239-1716. For an update on the health effects evaluation of these data, please contact the Toxicology Division at (512) 239-1795.

Analyst: Aaron Bluhm Date: 2/6/15
Aaron Bluhm

Laboratory Manager: Jaydeep Patel Date: 02/09/15
Jaydeep Patel

## Laboratory Analysis Results

### Request Number: 1501024

### Analysis Code: AP001VOC

Note: Results are reported in units of ppbv

| Lab ID | 1501024-Q01 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Field ID | N0560-012715 | | | | | | | | | |
| Canister ID | n0560 | | | | | | | | | |
| Compound | Conc. | SDL | SQL | Analysis Date | Flags** | Conc. | SDL | SQL | Analysis Date | Flags** |
| ethane | 1300 | 12 | 29 | 2/5/2015 | T,D2 | | | | | |
| ethylene | ND | 1.0 | 2.4 | 2/3/2015 | T,D1,NQ | | | | | |
| acetylene | ND | 1.0 | 2.4 | 2/3/2015 | T,D1 | | | | | |
| propane | 1200 | 12 | 29 | 2/5/2015 | T,D2 | | | | | |
| propylene | ND | 1.0 | 2.4 | 2/3/2015 | T,D1 | | | | | |
| dichlorodifluoromethane | 0.52 | 0.40 | 1.2 | 2/3/2015 | L,D1 | | | | | |
| methyl chloride | 0.59 | 0.40 | 1.2 | 2/3/2015 | L,D1 | | | | | |
| isobutane | 420 | 5.5 | 29 | 2/5/2015 | D2 | | | | | |
| vinyl chloride | ND | 0.34 | 1.2 | 2/3/2015 | D1 | | | | | |
| 1-butene | ND | 0.40 | 1.2 | 2/3/2015 | D1 | | | | | |
| 1,3-butadiene | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| n-butane | 810 | 4.8 | 29 | 2/5/2015 | D2 | | | | | |
| t-2-butene | ND | 0.36 | 1.2 | 2/3/2015 | D1 | | | | | |
| bromomethane | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| c-2-butene | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| 3-methyl-1-butene | ND | 0.46 | 1.2 | 2/3/2015 | D1 | | | | | |
| isopentane | 330 | 6.4 | 57 | 2/5/2015 | D2 | | | | | |
| trichlorofluoromethane | 0.25 | 0.58 | 1.2 | 2/3/2015 | J,D1 | | | | | |
| 1-pentene | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| n-pentane | 290 | 6.4 | 57 | 2/5/2015 | D2 | | | | | |
| isoprene | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| t-2-pentene | ND | 0.54 | 2.4 | 2/3/2015 | D1 | | | | | |
| 1,1-dichloroethylene | ND | 0.36 | 1.2 | 2/3/2015 | D1 | | | | | |
| c-2-pentene | ND | 0.50 | 2.4 | 2/3/2015 | D1 | | | | | |
| methylene chloride | 0.06 | 0.28 | 1.2 | 2/3/2015 | J,D1 | | | | | |
| 2-methyl-2-butene | 0.02 | 0.46 | 1.2 | 2/3/2015 | J,D1 | | | | | |
| 2,2-dimethylbutane | 10 | 0.42 | 1.2 | 2/3/2015 | D1 | | | | | |
| cyclopentene | ND | 0.40 | 1.2 | 2/3/2015 | D1 | | | | | |
| 4-methyl-1-pentene | ND | 0.44 | 2.4 | 2/3/2015 | D1 | | | | | |
| 1,1-dichloroethane | ND | 0.38 | 1.2 | 2/3/2015 | D1 | | | | | |
| cyclopentane | 3.1 | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| 2,3-dimethylbutane | 12 | 0.56 | 2.4 | 2/3/2015 | D1 | | | | | |
| 2-methylpentane | 85 | 6.4 | 14 | 2/5/2015 | D2 | | | | | |
| 3-methylpentane | 49 | 5.5 | 14 | 2/5/2015 | D2 | | | | | |
| 2-methyl-1-pentene + 1-hexene | ND | 0.40 | 4.8 | 2/3/2015 | D1 | | | | | |
| n-hexane | 94 | 4.8 | 29 | 2/5/2015 | D2 | | | | | |
| chloroform | ND | 0.42 | 1.2 | 2/3/2015 | D1 | | | | | |
| t-2-hexene | ND | 0.54 | 2.4 | 2/3/2015 | D1 | | | | | |
| c-2-hexene | ND | 0.54 | 2.4 | 2/3/2015 | D1 | | | | | |
| 1,2-dichloroethane | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| methylcyclopentane | 13 | 0.54 | 2.4 | 2/3/2015 | D1 | | | | | |
| 2,4-dimethylpentane | 4.6 | 0.54 | 2.4 | 2/3/2015 | D1 | | | | | |
| 1,1,1-trichloroethane | ND | 0.52 | 1.2 | 2/3/2015 | D1 | | | | | |
| benzene | 6.5 | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| carbon tetrachloride | 0.10 | 0.54 | 1.2 | 2/3/2015 | J,D1 | | | | | |
| cyclohexane | 20 | 0.48 | 1.2 | 2/3/2015 | D1 | | | | | |
| 2-methylhexane | 35 | 1.1 | 2.4 | 2/5/2015 | D3 | | | | | |
| 2,3-dimethylpentane | 6.1 | 0.52 | 1.2 | 2/3/2015 | D1 | | | | | |

## Laboratory Analysis Results

**Request Number: 1501024**

**Analysis Code: AP001VOC**

Note: Results are reported in units of ppbv

| Lab ID | 1501024-001 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Compound | Conc. | SDL | SQL | Analysis Date | Flags** | Conc. | SDL | SQL | Analysis Date | Flags** |
| 3-methylhexane | 29 | 0.80 | 2.4 | 2/5/2015 | D3 | | | | | |
| 1,2-dichloropropane | ND | 0.34 | 1.2 | 2/3/2015 | D1 | | | | | |
| trichloroethylene | ND | 0.58 | 1.2 | 2/3/2015 | D1 | | | | | |
| 2,2,4-trimethylpentane | ND | 0.48 | 1.2 | 2/3/2015 | D1 | | | | | |
| 2-chloropentane | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| n-heptane | 41 | 1.0 | 4.8 | 2/5/2015 | D3 | | | | | |
| c-1,3-dichloropropylene | ND | 0.40 | 1.2 | 2/3/2015 | D1 | | | | | |
| methylcyclohexane | 25 | 1.0 | 4.8 | 2/5/2015 | D3 | | | | | |
| t-1,3-dichloropropylene | ND | 0.40 | 1.2 | 2/3/2015 | D1 | | | | | |
| 1,1,2-trichloroethane | ND | 0.42 | 1.2 | 2/3/2015 | D1 | | | | | |
| 2,3,4-trimethylpentane | 0.10 | 0.48 | 2.4 | 2/3/2015 | J,DI | | | | | |
| toluene | 14 | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| 2-methylheptane | 11 | 0.40 | 2.4 | 2/3/2015 | D1 | | | | | |
| 3-methylheptane | 7.4 | 0.46 | 2.4 | 2/3/2015 | D1 | | | | | |
| 1,2-dibromoethane | ND | 0.40 | 1.2 | 2/3/2015 | D1 | | | | | |
| n-octane | 9.2 | 0.38 | 2.4 | 2/3/2015 | D1 | | | | | |
| tetrachloroethylene | ND | 0.48 | 1.2 | 2/3/2015 | D1 | | | | | |
| chlorobenzene | ND | 0.54 | 1.2 | 2/3/2015 | D1 | | | | | |
| ethylbenzene | 0.32 | 0.54 | 2.4 | 2/3/2015 | J,DI | | | | | |
| m & p-xylene | 3.8 | 0.54 | 4.8 | 2/3/2015 | L,DI | | | | | |
| styrene | ND | 0.54 | 2.4 | 2/3/2015 | D1 | | | | | |
| 1,1,2,2-tetrachloroethane | ND | 0.40 | 1.2 | 2/3/2015 | D1 | | | | | |
| o-xylene | 0.51 | 0.54 | 2.4 | 2/3/2015 | J,DI | | | | | |
| n-nonane | 0.92 | 0.44 | 1.2 | 2/3/2015 | L,DI | | | | | |
| isopropylbenzene | ND | 0.48 | 1.2 | 2/3/2015 | D1 | | | | | |
| n-propylbenzene | 0.02 | 0.54 | 1.2 | 2/3/2015 | J,DI | | | | | |
| m-ethyltoluene | 0.07 | 0.22 | 1.2 | 2/3/2015 | J,DI | | | | | |
| p-ethyltoluene | 0.06 | 0.32 | 2.4 | 2/3/2015 | J,DI | | | | | |
| 1,3,5-trimethylbenzene | 0.08 | 0.50 | 2.4 | 2/3/2015 | J,DI | | | | | |
| o-ethyltoluene | ND | 0.26 | 2.4 | 2/3/2015 | D1 | | | | | |
| 1,2,4-trimethylbenzene | 0.09 | 0.54 | 1.2 | 2/3/2015 | J,DI | | | | | |
| n-decane | 0.09 | 0.54 | 2.4 | 2/3/2015 | J,DI | | | | | |
| 1,2,3-trimethylbenzene | 0.01 | 0.54 | 1.2 | 2/3/2015 | J,DI | | | | | |
| m-diethylbenzene | ND | 0.54 | 2.4 | 2/3/2015 | DI | | | | | |
| p-diethylbenzene | ND | 0.54 | 1.2 | 2/3/2015 | DI | | | | | |
| n-undecane | 0.01 | 0.54 | 2.4 | 2/3/2015 | J,DI | | | | | |

## Laboratory Analysis Results

**Request Number: 1501024**

**Analysis Code: AP001VOC**

### Qualifier Notes:

ND - not detected
NQ - concentration can not be quantified due to possible interferences or coelutions.
SDL - Sample Detection Limit (Limit of Detection adjusted for dilutions).
SQL - Sample Quantitation Limit (Limit of Quantitation adjusted for dilution).
INV - Invalid.
J - Reported concentration is below SDL.
L - Reported concentration is at or above the SDL and is below the lower limit of quantitation.
E - Reported concentration exceeds the upper limit of instrument calibration.
M - Result modified from previous result.
T- Data was not confirmed by a confirmational analysis. Compound and/or results is tentatively identified.
F - Established acceptance criteria was not met due to factors outside the laboratory's control.
H - Not all associated hold time specifications were met. Data may be biased.
C - Sample received with a missing or broken custody seal.
R - Sample received with a missing or incomplete chain of custody.
I - Sample received without a legible unique identifier.
G - Sample received in an improper container.
U - Sample received with insufficient sample volume.
W - Sample received with insufficient preservation.

Quality control notes for AP001VOC samples.

D1-Sample concentration was calculated using a dilution factor of 4.
D2-Sample concentration was calculated using a dilution factor of 47.76.
D3-Sample concentration was calculated using a dilution factor of 8.

TCEQ laboratory customer support may be reached at Jaydeep.Patel@tceq.texas.gov

**Table 1. Comparison of Monitored Concentrations in Lab Sample 1501024-001 to TCEQ Short-Term AMCVs**

| Lab Sample ID | 1501024-001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **SQL ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| 1,1,1-Trichloroethane | 380,000 | 1,700 | 1.2 | ND | D1 | 0.52 |
| 1,1,2,2-Tetrachloroethane | 7,300 | 10 | 1.2 | ND | D1 | 0.4 |
| 1,1,2-Trichloroethane | Not Available | 100 | 1.2 | ND | D1 | 0.42 |
| 1,1-Dichloroethane | Not Available | 1,000 | 1.2 | ND | D1 | 0.38 |
| 1,1-Dichloroethylene | Not Available | 180 | 1.2 | ND | D1 | 0.36 |
| 1,2,3-Trimethylbenzene | Not Available | 250 | 1.2 | 0.01 | J,D1 | 0.54 |
| 1,2,4-Trimethylbenzene | 140 | 250 | 1.2 | 0.09 | J,D1 | 0.54 |
| 1,2-Dibromoethane | Not Available | 0.5 | 1.2 | ND | D1 | 0.4 |
| 1,2-Dichloroethane | 6,000 | 40 | 1.2 | ND | D1 | 0.54 |
| 1,2-Dichloropropane | 250 | 100 | 1.2 | ND | D1 | 0.34 |
| 1,3,5-Trimethylbenzene | Not Available | 250 | 2.4 | 0.08 | J,D1 | 0.5 |
| 1,3-Butadiene | 230 | 1,700 | 1.2 | ND | D1 | 0.54 |
| 1-Butene | 360 | 27,000 | 1.2 | ND | D1 | 0.4 |
| 1-Pentene | 100 | 2,600 | 1.2 | ND | D1 | 0.54 |
| 2,2,4-Trimethylpentane | 670 | 750 | 1.2 | ND | D1 | 0.48 |
| 2,2-Dimethylbutane (Neohexane) | Not Available | 1,000 | 1.2 | 10 | D1 | 0.42 |
| 2,3,4-Trimethylpentane | Not Available | 750 | 2.4 | 0.1 | J,D1 | 0.48 |
| 2,3-Dimethylbutane | 420 | 990 | 2.4 | 12 | D1 | 0.56 |
| 2,3-Dimethylpentane | 4,500 | 850 | 1.2 | 6.1 | D1 | 0.52 |
| 2,4-Dimethylpentane | 940 | 850 | 2.4 | 4.6 | D1 | 0.54 |
| 2-Chloropentane (as chloroethane) | Not Available | 240 | 1.2 | ND | D1 | 0.54 |
| 2-Methyl-1-Pentene +1-Hexene | 140 | 500 | 4.8 | ND | D1 | 0.4 |
| 2-Methyl-2-Butene | Not Available | 2,600 | 1.2 | 0.02 | J,D1 | 0.46 |
| 2-Methylheptane | 110 | 750 | 2.4 | 11 | D1 | 0.4 |
| 2-Methylhexane | 420 | 750 | 2.4 | 35 | D3 | 1.1 |

| Lab Sample ID | 1501024-001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **SQL ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| 2-Methylpentane (Isohexane) | 7,000 | 850 | 14 | 85 | D2 | 6.4 |
| 3-Methyl-1-Butene | 250 | 8,000 | 1.2 | ND | D1 | 0.46 |
| 3-Methylheptane | 1,500 | 750 | 2.4 | 7.4 | D1 | 0.46 |
| 3-Methylhexane | 840 | 750 | 2.4 | 29 | D3 | 0.8 |
| 3-Methylpentane | 8,900 | 1,000 | 14 | 49 | D2 | 5.5 |
| 4-Methyl-1-Pentene (as hexene) | 140 | 500 | 2.4 | ND | D1 | 0.44 |
| Acetylene | Not Available | 25,000 | 2.4 | ND | T,D1 | 1 |
| Benzene | 2,700 | 180 | 1.2 | 6.5 | D1 | 0.54 |
| Bromomethane (methyl bromide) | Not Available | 30 | 1.2 | ND | D1 | 0.54 |
| c-1,3-Dichloropropylene | Not Available | 10 | 1.2 | ND | D1 | 0.4 |
| c-2-Butene | 2,100 | 15,000 | 1.2 | ND | D1 | 0.54 |
| c-2-Hexene | 140 | 500 | 2.4 | ND | D1 | 0.54 |
| c-2-Pentene | Not Available | 2,600 | 2.4 | ND | D1 | 0.5 |
| Carbon Tetrachloride | 4,600 | 20 | 1.2 | 0.1 | J,D1 | 0.54 |
| Chlorobenzene (phenyl chloride) | 1,300 | 100 | 1.2 | ND | D1 | 0.54 |
| Chloroform (trichloromethane) | 3,800 | 20 | 1.2 | ND | D1 | 0.42 |
| Cyclohexane | 2,500 | 1,000 | 1.2 | 20 | D1 | 0.48 |
| Cyclopentane | Not Available | 1,200 | 1.2 | 3.1 | D1 | 0.54 |
| Cyclopentene | Not Available | 2,900 | 1.2 | ND | D1 | 0.4 |
| Dichlorodifluoromethane | Not Available | 10,000 | 1.2 | 0.52 | L,D1 | 0.4 |
| Ethane | Not Available | Simple Asphyxiant* | 29 | 1300 | T,D2 | 12 |
| Ethylbenzene | 170 | 20,000 | 2.4 | 0.32 | J,D1 | 0.54 |
| Ethylene | 270,000 | 500,000 | 2.4 | ND | T,D1,NQ | 1 |
| Isobutane | Not Available | 33,000 | 29 | 420 | D2 | 5.5 |
| Isopentane (2-methylbutane) | 1,300 | 68,000 | 57 | 330 | D2 | 6.4 |
| Isoprene | 48 | 20 | 1.2 | ND | D1 | 0.54 |

| Lab Sample ID | 1501024-001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **SQL ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| Isopropylbenzene (cumene) | 48 | 500 | 1.2 | ND | D1 | 0.48 |
| m & p-Xylene (as mixed isomers) | 80 | 1,700 | 4.8 | 3.8 | L,D1 | 0.54 |
| m-Diethylbenzene | 70 | 460 | 2.4 | ND | D1 | 0.54 |
| Methyl Chloride (chloromethane) | Not Available | 500 | 1.2 | 0.59 | L,D1 | 0.4 |
| Methylcyclohexane | 150 | 4,000 | 4.8 | 25 | D3 | 1 |
| Methylcyclopentane | 1,700 | 750 | 2.4 | 13 | D1 | 0.54 |
| Methylene Chloride (dichloromethane) | 160,000 | 3,500 | 1.2 | 0.06 | J,D1 | 0.28 |
| m-Ethyltoluene | 18 | 250 | 1.2 | 0.07 | J,D1 | 0.22 |
| n-Butane | 1,200,000 | 92,000 | 29 | 810 | D2 | 4.8 |
| n-Decane | 620 | 1,750 | 2.4 | 0.09 | J,D1 | 0.54 |
| n-Heptane | 670 | 850 | 4.8 | 41 | D3 | 1 |
| n-Hexane | 1,500 | 1,800 | 29 | 94 | D2 | 4.8 |
| n-Nonane | Not Available | 2,000 | 1.2 | 0.92 | L,D1 | 0.44 |
| n-Octane | 1,700 | 750 | 2.4 | 9.2 | D1 | 0.38 |
| n-Pentane | 1,400 | 68,000 | 57 | 290 | D2 | 6.4 |
| n-Propylbenzene | 48 | 500 | 1.2 | 0.02 | J,D1 | 0.54 |
| n-Undecane | 870 | 550 | 2.4 | 0.01 | J,D1 | 0.54 |
| o-Ethyltoluene | 74 | 250 | 2.4 | ND | D1 | 0.26 |
| o-Xylene | 380 | 1,700 | 2.4 | 0.51 | J,D1 | 0.54 |
| p-Diethylbenzene | 70 | 460 | 1.2 | ND | D1 | 0.54 |
| p-Ethyltoluene | 8.1 | 250 | 2.4 | 0.06 | J,D1 | 0.32 |
| Propane | 1,500,000 | Simple Asphyxiant* | 29 | 1200 | T,D2 | 12 |
| Propylene | 13,000 | Simple Asphyxiant* | 2.4 | ND | T,D1 | 1 |
| Styrene | 25 | 5,100 | 2.4 | ND | D1 | 0.54 |
| t-1,3-Dichloropropylene | Not Available | 10 | 1.2 | ND | D1 | 0.4 |
| t-2-Butene | 2,100 | 15,000 | 1.2 | ND | D1 | 0.36 |

| Lab Sample ID | 1501024-001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **SQL ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| t-2-Hexene | 140 | 500 | 2.4 | ND | D1 | 0.54 |
| t-2-Pentene | Not Available | 2,600 | 2.4 | ND | D1 | 0.54 |
| Tetrachloroethylene | 770 | 1,000 | 1.2 | ND | D1 | 0.48 |
| Toluene | 920 | 4,000 | 1.2 | 14 | D1 | 0.54 |
| Trichloroethylene | 3,900 | 100 | 1.2 | ND | D1 | 0.58 |
| Trichlorofluoromethane | 5,000 | 10,000 | 1.2 | 0.25 | J,D1 | 0.58 |
| Vinyl Chloride | Not Available | 26,000 | 1.2 | ND | D1 | 0.34 |

*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.
ppbv - Parts per billion by volume.
ND - Not detected.
NQ - Concentration can not be quantified due to possible interferences or coelutions.
SDL - Sample Detection Limit (Limit of Detection adjusted for dilution).
SQL – Sample Quantitation Limit (Limit of Quantitation adjusted for dilution).
INV - Invalid.
J - Reported concentration is below SDL.
L - Reported concentration is at or above the SDL and is below the lower limit of quantitation.
E - Reported concentration exceeds the upper limit of instrument calibration.
M - Result modified from previous result.
T - Data was not confirmed by a confirmational analysis. Data is tentatively identified.
F - Established acceptance criteria were not met due to factors outside the laboratory's control.
H – Not all associated hold time specifications were met. Data may be biased.
C - Sample received with a missing or broken custody seal.
R - Sample received with a missing or incomplete chain of custody.
I - Sample received without a legible unique identifier.
G - Sample received in an improper container.
U - Sample received with insufficient sample volume.
W - Sample received with insufficient preservation.
D1 - Sample concentration was calculated using a dilution factor of 4.

D2 - Sample concentration was calculated using a dilution factor of 47.76.
D3 - Sample concentration was calculated using a dilution factor of 8.

## Table 2. TCEQ Long-Term Air Monitoring Comparison Values (AMCVs)

**Please Note: The long-term AMCVs are provided for informational purposes only because it is scientifically inappropriate to compare short-term monitored values to the long-term AMCV.**

| Compound | Long-Term Health AMCV ($ppb_v$) | Compound | Long-Term Health AMCV ($ppb_v$) |
|---|---|---|---|
| 1,1,1-Trichloroethane | 940 | Cyclopentane | 120 |
| 1,1,2,2-Tetrachloroethane | 1 | Cyclopentene | 290 |
| 1,1,2-Trichloroethane | 10 | Dichlorodifluoromethane | 1,000 |
| 1,1-Dichloroethane | 100 | Ethane | Simple Asphyxiant* |
| 1,1-Dichloroethylene | 86 | Ethylbenzene | 450 |
| 1,2,3-Trimethylbenzene | 25 | Ethylene** | 5,300 |
| 1,2,4-Trimethylbenzene | 25 | Isobutane | 2,400 |
| 1,2-Dibromoethane | 0.05 | Isopentane (2-methylbutane) | 8,000 |
| 1,2-Dichloroethane | 1 | Isoprene | 2 |
| 1,2-Dichloropropane | 10 | Isopropylbenzene (cumene) | 50 |
| 1,3,5-Trimethylbenzene | 25 | m & p-Xylene (as mixed isomers) | 140 |
| 1,3-Butadiene | 9.1 | m-Diethylbenzene | 46 |
| 1-Butene | 2,300 | Methyl Chloride (chloromethane) | 50 |
| 1-Pentene | Not Available | Methylcyclohexane | 400 |
| 2,2,4-Trimethylpentane | 75 | Methylcyclopentane | 75 |
| 2,2-Dimethylbutane (Neohexane) | 100 | Methylene Chloride (dichloromethane) | 100 |
| 2,3,4-Trimethylpentane | 75 | m-Ethyltoluene | 25 |
| 2,3-Dimethylbutane | 99 | n-Butane | 2,400 |
| 2,3-Dimethylpentane | 85 | n-Decane | 175 |
| 2,4-Dimethylpentane | 85 | n-Heptane | 85 |
| 2-Chloropentane (as chloroethane) | 24 | n-Hexane | 190 |
| 2-Methyl-1-Pentene +1-Hexene | 50 | n-Nonane | 200 |

| Compound | Long-Term Health AMCV ($ppb_v$) | Compound | Long-Term Health AMCV ($ppb_v$) |
|---|---|---|---|
| 2-Methyl-2-Butene | Not Available | n-Octane | 75 |
| 2-Methylheptane | 75 | n-Pentane | 8,000 |
| 2-Methylhexane | 75 | n-Propylbenzene | 50 |
| 2-Methylpentane (Isohexane) | 85 | n-Undecane | 55 |
| 3-Methyl-1-Butene | 800 | o-Ethyltoluene | 25 |
| 3-Methylheptane | 75 | o-Xylene | 140 |
| 3-Methylhexane | 75 | p-Diethylbenzene | 46 |
| 3-Methylpentane | 100 | p-Ethyltoluene | 25 |
| 4-Methyl-1-Pentene (as hexene) | 50 | Propane | Simple Asphyxiant* |
| Acetylene | 2,500 | Propylene | Simple Asphyxiant* |
| Benzene | 1.4 | Styrene | 110 |
| Bromomethane (methyl bromide) | 3 | t-1,3-Dichloropropylene | 1 |
| c-1,3-Dichloropropylene | 1 | t-2-Butene | 690 |
| c-2-Butene | 690 | t-2-Hexene | 50 |
| c-2-Hexene | 50 | t-2-Pentene | Not Available |
| c-2-Pentene | Not Available | Tetrachloroethylene*** | 3.8 |
| Carbon Tetrachloride | 2 | Toluene | 1,100 |
| Chlorobenzene (phenyl chloride) | 10 | Trichloroethylene | 10 |
| Chloroform (trichloromethane) | 2 | Trichlorofluoromethane | 1,000 |
| Cyclohexane | 100 | Vinyl Chloride | 0.45 |

*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.
**Long-term vegetation AMCV for Ethylene is 30 ppb.
***Long-term vegetation AMCV for Tetrachloroethylene is 12 ppb.